

What is Claimed is:

1. A process for the continuous hydrogenation of a compound capable of being hydrogenated, comprising:
 - 5 a) dissolving the compound in a working solution and combining said working solution with a hydrogen-containing hydrogenation gas in a hydrogenation reactor;
 - 10 b) hydrogenating the mixture produced in step a) under hydrogenation conditions to obtain an at least partly hydrogenated compound and a hydrogen-containing waste hydrogenation gas; and
 - c) compressing part of the waste hydrogenation gas using a jet pump and recycling the compressed gas into the hydrogenation reactor,
- 15 wherein a liquid or gaseous feedstock is fed into the hydrogenation reactor at a pressure that is greater than the pressure at which the compressed hydrogenation gas is fed into the hydrogenation reactor and is used as motive agent for the jet pump.
- 20 2. The process of claim 1, wherein hydrogen-containing hydrogenation gas, particularly hydrogen from a cracked gas plant, is used as said motive medium and a gas jet pump is used as said jet pump.
- 25 3. The process of claim 1, wherein a non-hydrogenated working solution or a liquid component of a non-hydrogenated working solution is used as said motive medium and a liquid jet pump is used as said jet pump.
- 30 4. The process of any one of claims 1 to 3, wherein said continuous hydrogenation is the hydrogenation step of the anthraquinone process for the production of hydrogen peroxide, comprising:
 - a) at least partially hydrogenating anthraquinone derivatives and/or tetrahydroanthraquinone derivatives dissolved in a working solution

to the corresponding anthrahydroquinone and/or tetrahydroanthrahydroquinone derivatives;

- b) oxidising the hydrogenated working solution;
 - c) extracting hydrogen peroxide formed from the oxidised working solution with water and/or a dilute aqueous hydrogen peroxide solution; and
 - d) recycling the extracted working solution is into the hydrogenation reactor.
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- 10 5. The process of claim 4, wherein at least part of the extracted working solution is used as motive agent for the compression of the waste hydrogenation gas.
6. The process of claim 4, wherein:
- a) the waste hydrogenation gas is compressed using a gas jet pump with a hydrogen-containing hydrogenation gas as motive agent;
 - b) the gas mixture obtained from step a) is mixed with extracted working solution using a venturi nozzle; and
 - c) the mixture is fed into the hydrogenation reactor.
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- 20 7. The process of claim 4, wherein:
- a) said hydrogenation is performed under a pressure in the range of 0.1 MPa to 2.0 MPa (absolute) and at a temperature in the range of 20 to 100°C; and
 - b) part of the hydrogenated working solution is recycled into the reactor.
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8. The process of claim 4, wherein the sum of the waste hydrogenation gas stream and the motive gas stream used for the compression thereof is less than that of the hydrogenation gas stream introduced into the hydrogenation reactor, whereby each stream is calculated at standard temperature and standard pressure.
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9. The process of claim 4, wherein the volume of the stream of extracted working solution used for the compression of the waste hydrogenation gas stream is equal to

or less than that of the stream of extracted working solution fed into the hydrogenation.

- 5 10. The process of claim 4, wherein the hydrogenation is performed in a loop reactor, gas-lift reactor, fluidised bed reactor, tubular reactor or stirred vessel reactor in the presence of a palladium-containing heterogeneous hydrogenation catalyst.